WHAT IS CLAIMED IS:

1. A method of detecting a component of interest, the method comprising:

(a) providing one or more nanowires, which nanowires comprise one or more functional group, which functional group undergoes a change in charge in the presence of the component of interest;

(b) contacting the one or more nanowires with a solution comprising the component of interest; which component produces the change in charge in the functional groups, which change in charge results in a detectable signal; and,

(c) detecting the signal, thereby detecting the component of interest.

2. The method of claim **1**, wherein the component of interest comprises an enzyme, a nucleic acid, or a protein.

3. The method of claim **2**, wherein the enzyme comprises a protease, a kinase, a phosphatase, a protease, a polymerase, a ligase, or a transferase.

4. The method of claim **1**, wherein the component of interest comprises an enzyme and the functional group comprises an enzymatic substrate.

5. The method of claim **4**, wherein the enzymatic substrate comprises a protein, a peptide, or an oligonucleotide.

6. The method of claim **4**, the method further comprising determining an initial rate for an enzymatic activity of the enzyme.

7. The method of claim **1**, wherein the functional group comprises a hairpin oligonucleotide.

8. The method of claim **7**, wherein the hairpin comprises a first end, a second end, and a central portion, wherein the first end and the second end are complementary to each other and the central portion is complementary to the component of interest, and wherein the first end comprises a charge moiety that is proximal to the nanowires; wherein binding the component of interest to the central portion of the hairpin oligonucleotide unfolds the hairpin, thereby moving the charge moiety away from the nanowires, producing the change in charge.

9. The method of claim **8**, wherein the charge moiety comprises a latex bead comprising a carboxylate or amine surface, a nucleic acid, a highly charged polypeptide, a charged polymer, one or more negatively charged nucleotides, or a metal nanocrystal.

10. A nanosensor array for detection of a change in charge, the array comprising a plurality of nanowires, which nanowires each comprise one or more functional group, which functional group undergoes a change in charge when exposed to a component of interest.

11. The nanosensor of claim **10**, wherein the component of interest comprises an enzyme and the functional group comprises an enzymatic substrate.

12. The nanosensor of claim **10**, wherein the functional group comprises a hairpin oligonucleotide.

13. The nanosensor of claim **12**, wherein the hairpin comprises a first end, a second end, and a central portion, wherein the first end and the second end are complementary to each other and the central portion is complementary to the component of interest, and wherein the first end comprises a charge moiety that is proximal to the nanowires; wherein binding the component of interest to the central portion of the hairpin oligonucleotide unfolds the hairpin, thereby moving the charge moiety away from the nanowires, producing the change in charge

14. The nanosensor of claim **13**, wherein the charge moiety comprises a latex bead comprising a carboxylate or amine surface, a nucleic acid, a highly charged polypeptide, a charged polymer, one or more negatively charged nucleotides, or a metal nanocrystal.

15. The nanosensor of claim **12**, wherein the component of interest comprises an oligonucleotide.

16. A method of detecting glucose, the method comprising:

(a) providing one or more nanowires that comprise glucose oxidase immobilized thereon or proximal thereto;

(b) contacting the nanowires with a test solution; wherein any glucose present in the test solution is oxidized by the glucose oxidase resulting in a change in pH of the test solution, wherein the change in pH produces a signal in the nanowires; and,

(c) detecting the signal, thereby detecting the glucose in the test solution.

17. A glucose nanosensor comprising one or more nanowires and glucose oxidase, wherein the glucose oxidase is proximal to the nanowires or immobilized on the nanowires.

18. A method of measuring one or more cellular responses to a test compound, the method comprising:

(a) contacting an array of nanowires with a plurality of cells, which cells associate with one or more of the nanowires of the array, thereby generating a first signal;

(b) detecting the first signal;

(c) contacting the cells with the test compound, thereby generating the one or more cellular responses, which cellular responses produce a second signal; and,

(d) detecting the second signal, thereby measuring the one or more cellular responses.

19. The method of claim **18**, further comprising comparing the first signal and the second signal.

20. The method of claim **18**, wherein the cellular responses are selected from: cell death, cell proliferation, cell migration, a morphological change, a change in an analyte within the cells, a change in pH, a change in a membrane potential, a change in a redox potential, and a change in an ion concentration.

21. The method of claim **18**, wherein the nanowires are non-functionalized nanowires.

22. The method of claim **18**, further comprising detecting multiple cellular responses simultaneously.

23. The method of claim **18**, wherein the cellular responses result in one or more additional cells associating with the nanowires, one or more of the cells disassociating from the nanowires and/or one or more of the cells migrating from a first nanowire to a second nanowire.

24. The method of claim **18**, wherein detecting the second signal comprises monitoring association of one or more additional cells with the nanowires to measure cell growth, monitoring disassociation of one or more cells from the nanowires to measure cell

death, and/or monitoring migration of one or more cells from a first nanowire to a second nanowire to measure cell migration.

25. The method of claim **18**, wherein the cells do not specifically bind to the nanowires.

26. The method of claim **18**, wherein the cells specifically bind to the nanowires.

27. The method of claim **18**, wherein the array of nanowires is positioned in one or more microwells or within a microfluidic device.

28. The method of claim **27**, wherein the microwells comprise a liquid-tight seal.

29. A detection system comprising:

(a) a plurality of microwells or microchannels;

(b) one or more nanowires positioned within each of the plurality of microwells or microchannels for detecting a component of interest or a cellular event; and,

(c) a detector coupled to the nanowires for detecting one or more signals generated in the nanowires.

30. The detection system of claim **29**, further comprising at least a first cell in each of the microwells or microchannels.

31. The detection system of claim **29**, wherein the microwells or microchannels comprise a liquid-tight seal.

32. The detection system of claim **30**, wherein at least one of the microwells or microchannels comprises a test compound.

33. The detection system of claim **30**, wherein each microwell comprises a different test compound.

34. The detection system of claim **29**, further comprising a delivery system for delivery of one or more reagents to each microwell.

35. The detection system of claim **34**, wherein the one or more reagents comprises one or more cells and/or one or more test compounds.

36. The detection system of claim **29**, wherein the one or more nanowires in the microwells comprise or constitute an array of nanowires.

37. The detection system of claim **36**, wherein the array of nanowires comprises a plurality of functionalized wires and a plurality of non-functionalized wires.

38. The detection system of claim **36**, wherein the array of nanowires comprises a plurality of functionalized nanowires.

39. The detection system of claim **36**, wherein the array of nanowires comprises a plurality of non-functionalized nanowires.

40. A method of measuring a cellular response to a test compound, the method comprising:

(a) positioning a nanowire such that it is proximal to a cellular membrane or penetrating a cellular membrane, wherein the nanowire generates a signal in response to the cellular response; and,

(b) detecting the signal, thereby measuring the cellular response.

41. The method of claim **40**, wherein step (a) comprises positioning an array of nanowires in an array of microwells, which microwells comprise one or more cells, wherein the one or more cells engulf the nanowires via endocytosis, thereby penetrating the cellular membrane.

42. The method of claim **40**, wherein step (a) comprises providing an array of suspended nanowires and depositing one or more cell on each of the nanowires.

43. The method of claim **40**, wherein the cellular response comprises a change in an analyte within the cell, a change in pH, a change in a membrane potential, a change in a redox potential, or a change in an ion concentration.

44. The method of claim **40**, wherein the test compound comprises a drug, a toxin, a pathogen, a virus, an enzymatic inhibitor, or an enzymatic activator.

45. An intracellular detection device comprising:

(a) an array of nanowires; and,

(b) a cell associated with each nanowire in the array, wherein a portion of the nanowire extends through the cellular membrane.

46. A method of detecting presence of a component of interest and a cellular event simultaneously, the method comprising:

(a) providing a nanosensor array comprising a plurality of functionalized nanowires and a plurality of non-functionalized nanowires;

(b) contacting the nanosensor array with a test solution comprising the component of interest, wherein the component of interest binds to the functionalized nanowires, resulting in a first signal and a cellular event, which cellular event results in a second signal from the non-functionalized nanowires;

(c) detecting the first signal and the second signal, thereby detecting the presence of the component of interest and the cellular event.

47. An array comprising a plurality of functionalized nanowires and a plurality of non-functionalized nanowires.

48. The array of claim **47**, wherein the functionalized nanowires are configured to detect a component of interest and the non-functionalized nanowires are configured to detect a cellular event during operation of the system.

49. The array of claim **48**, wherein the functionalized nanowires comprise a phage or antibody capture molecule.

50. The array of claim **48**, wherein the nanowires are positioned in a microfluidic device.

51. The array of claim **50**, wherein the nanowires are positioned in one or more channels within the microfluidic device.

52. The array of claim **48**, wherein the nanowires are positioned in an array of microwells.

53. A method of detecting one or more cellular component, the method comprising:

(a) heating one or more cells, resulting in one or more cellular fragments comprising the one or more cellular component;

(b) depositing the one or more cellular fragments on one or more nanowires; and,

(c) detecting the one or more cellular fragments, thereby detecting the one or more cellular components.

54. The method of claim **53**, wherein the one or more cells comprise spores.

55. The method of claim **53**, wherein step (a) comprises heating the cells with one or more cell disruption agent.

56. The method of claim **55**, wherein the cell disruption agent comprises a surfactant.

57. The method of claim **53**, wherein the nanowires comprise functionalized nanowires.

58. The method of claim **53**, further comprising processing the cellular fragments prior to step (b).

59. The method of claim **53**, wherein the processing comprises separating the cellular fragments, filtering the cellular fragments, or condensing the cellular fragments.

60. The method of claim **53**, wherein the cellular fragments are in a gaseous phase.

61. The method of claim **53**, wherein the cellular fragments are in a solution phase.

62. The method of claim **53**, wherein the detecting comprises identifying a pattern of cellular fragments.

63. An apparatus for analyzing one or more cells, the apparatus comprising:

(a) a pyrolysis chamber for fragmenting the one or more cells;

(b) a gas intake coupled to the pyrolysis chamber for introducing a gas into the pyrolysis chamber;

(c) one or more nanowires coupled to the pyrolysis chamber for receiving one or more fragmented cells from the pyrolysis chamber; and,

(d) a detector coupled to the nanowires, for detecting the one or more fragmented cells.

64. The apparatus of claim **63**, wherein the nanowires comprise functionalized nanowires.

65. The apparatus of claim **63**, further comprising a processing station coupled to the pyrolysis chamber and to the one or more nanowires for processing the one or more cellular fragments prior to detecting the one or more fragmented cells.

66. The apparatus of claim **65**, wherein the processing station comprises a separation device, a filtration device, or a condenser.

67. The apparatus of claim **66**, wherein the separation device comprises a separation column or a mass spectrometer.

68. A method of detecting an analyte at multiple concentrations, the method comprising:

(a) providing a microfluidic device comprising at least a first channel having a bottom and a top, which first channel comprises an array of nanowires positioned along the bottom of the channel, which array is configured to detect the analyte at a plurality of positions along the bottom of the channel;

(b) flowing a buffer solution along the top of the channel:

(c) flowing a test solution comprising the analyte along the bottom of the channel, thereby mixing the test solution and the buffer solution, resulting in a concentration gradient of the analyte along the bottom of the channel; and,

(d) detecting the analyte at one or more of the plurality of positions along the bottom of the channel, thereby detecting the analyte at multiple concentrations.

69. The method of claim **68**, wherein the nanowires have one or more cells associated therewith.

70. The method of claim **72**, further comprising detecting a cellular response to the analyte at the one or more positions, thereby detecting a cellular response to the analyte at multiple analyte concentrations.

71. The method of claim **68**, wherein the nanowires comprise functionalized nanowires.

72. A microfluidic device comprising a microfluidic channel, the microfluidic channel having a top surface and a bottom surface, wherein the top surface comprises a rough surface to aid mixing and the bottom surface comprises a nanowire array for detection.

73. A method of amplifying a field effect signal, the method comprising,

(a) providing a field effect transistor, which transistor comprises a substrate;

(b) linking a hairpin oligonucleotide to the substrate, which hairpin comprises a first end, a second end, and a central portion, wherein the first end and the second end are complementary to each other and the central portion is complementary to a component of interest, and wherein the first end comprises a charge moiety that is proximal to the substrate;

(c) binding a component of interest to the central portion of the hairpin oligonucleotide which binding results in a signal and unfolds the hairpin, thereby moving the charge moiety away from the substrate and amplifying the signal.

74. The method of claim **73**, wherein the charge moiety comprises a latex bead comprising a carboxylate or amine surface, a nucleic acid, a highly charged polypeptide, a charged polymer, or a metal nanocrystal.

75. The method of claim **73**, wherein the charge moiety comprises one or more negatively charged nucleotides.

76. A field effect transistor comprising a substrate, which substrate comprises a hairpin oligonucleotide.

77. The field effect transistor of claim **76**, wherein the hairpin oligonucleotide comprises a first end, a second end, and a central portion, wherein the first end and the second end are complementary to each other and the central portion is complementary to a component of interest.

78. The field effect transistor of claim **76**, further comprising a charged moiety linked to the hairpin oligonucleotide.

79. A method of analyzing a single binding event, the method comprising:

(a) contacting a nanowire with one or more components of interest, which components of interest bind to the nanowire, wherein contacting results in a plurality of binding events, wherein each of the binding events produces a signal;

(b) detecting the signal; and,

(c) analyzing one or more fluctuations in the signal, thereby analyzing a single binding event.

80. A method of preparing a functionalized nanowire array, the method comprising:

(a) providing a plurality of nanowires;

(b) depositing a functional element on the nanowires, thereby functionalizing the nanowires.

81. The method of claim **80**, wherein depositing the functional element comprises pin-printing or ink-jet printing.